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Angel Cognition and Active Involvement in BAN Governance and Management

Peter Wirtz, Christophe Bonnet, Laurence Cohen¹

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Abstract: *The present research sets out to reach a better understanding of the determinants of Business Angels' active involvement in making BANs accomplish diverse functions and building cognitive resources and shared competencies. We propose a framework where angels' human capital and cognitive process (in terms of predictive vs. control-oriented behavior) are key in explaining their degree and type of involvement with diverse BAN activities. To test the related assumptions, we conducted a questionnaire survey with a regional French Business Angel Network.*

In the market for entrepreneurial finance, specific investor categories have been shown to play distinctive roles for the success and performance of young entrepreneurial ventures. Two generic investor categories appear to be especially prevalent in contributing growth capital to entrepreneurial ventures: formal venture capital firms (VCs) and Business Angels (BAs).

Business angels can be defined as “private individuals using their own money, directly in unquoted companies in which they have no family connection” (Harrison and Mason, 1999). They make an important contribution to closing the equity gap for early stage ventures, where uncertainty is high and funding needs are below formal VCs' investment threshold. Beyond money, BAs have been shown to contribute to young ventures' growth and success in various ways, based on their specific knowledge, skills and cognitive process. It has been argued, for instance, that BAs contribute “*their skills, knowledge and contacts in a variety of informal and formal roles*” (Harrison and Mason, 1999, p. 95). Such value adding roles consist of acting as a sounding board for entrepreneurs in developing their strategy, supervision and monitoring, resource acquisition and mentoring (Politis, 2008). In fact, empirical results from Wiltbank (2005, p. 355) make a case for the role of active angels in venture success. Research on the antecedents of active BA involvement is still scarce, but existing results indicate the importance of certain cognitive features. For instance, some BAs reach an intuitive grasp of

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particular ventures' growth opportunities, due to their personal experience and knowledge (human capital), and then are able to translate their perception into professional investors' predictive language (decision-making style), helping raise additional growth capital (Bonnet, Wirtz, Haon, 2013). Others directly influence a venture's success or failure through their specific investment behavior. Wiltbank et al. (2009) have shown that BAs whose decision making style is non-predictive but highly control oriented² have lower failure rates than their highly predictive counterparts but invest on average in smaller ventures with lower rates of return in case of success. Being control-oriented, they closely interact with the entrepreneurs and potentially exert direct influence on young ventures' strategic trajectory and managerial capabilities. Human capital and cognitive features characterizing individual BAs, be it in terms of knowledge and skills or in terms of decision-making style, are thus relevant for the type of angel involvement and, ultimately, young ventures' growth and success.

The market for informal venture capital, however, features a very high degree of information asymmetry, which makes it difficult for early stage start-ups to match with the appropriate angels. That is why, in an effort to narrow the equity gap, there have been numerous initiatives since the late 1990ties to develop formal business angel networks (BANs). An early example is Silicon Valley's Band of Angels founded in 1994. In Europe, the number of operating BANs has increased dramatically. According to EBAN (2014), the number of BANs rose from 66 in 1999 to a total of 468 in 2014 (84 of which in France alone, most of them with a regional outreach). The setting up of organized BANs has been partly sponsored by public policy initiatives in an attempt to make the informal capital market more efficient by raising the awareness and visibility of potential angel investment and by reducing information asymmetry through various matching events (Arnoudt and Erikson, 2002; Collewaert *et al.*, 2010; zu Knyphausen-Aufsess and Westphal, 2008). The inception and spread of BANs can thus be qualified as a significant phenomenon characterizing the dynamics of the contemporary informal venture capital market. The functions of BANs have changed over time, from offering mere matching services to act as syndicates providing due diligence, deal structuring and post-investment services, as well as contributing to educate BAs and entrepreneurs (Gregson et al., 2013; Lange *et al.*, 2003; Mason, 2006). Zu Knyphausen-Aufsess and Westphal (2008) hence identify four generic functions which BANs

² Control-oriented decision making is a cognitive style close to Sarasvathy's concept of effectuation. While predictive individuals base their decisions mainly on *ex ante* predictions of decision outcomes, control-oriented decision makers do not rely on such *a priori* estimates but make decisions based on the perception of their capacity to subsequently influence a project and its performance in various ways while (even unanticipated) events unfold, based on whatever resources (skills and knowledge) they possess.

may typically assume to various degrees: (1) mobilize and select capital seeking ventures and BAs, (2) match ventures and BAs, (3) allow for networking among investors and service providers, (4) provide consulting services (competency building) to angels and/or entrepreneurs (including education of angels and entrepreneurs, post-investment monitoring and resource provision...). The latter function indicates that BANs are potential knowledge and skill enhancers for their members and the ventures they invest in. In an environment of scarce resources, the capacity of a BAN to assume its potential functions depends on the active involvement of its members. Though BANs frequently employ some administrative and managerial staff (“gatekeepers”) (Paul and Whittam, 2010; Zu Knyphausen-Aufsess and Westphal, 2008), anecdotal evidence shows that in many BANs deal selection, due diligence and post-investment monitoring largely rely on a small number of active volunteer members. This can also be assumed to hold true for building up network-specific competencies by leveraging individual angels’ human capital. Active BAs can thus be assumed key in a BAN’s success to deliver added value to its members. However, though BANs tend to offer a broad range of services, which implies complex tasks, research on the factors driving their efficacy, on their internal organization and management, and on the way they mobilize the competencies of their members is still scarce.

Not all BAs share the same cognitive features or are equally involved with their ventures. If being actively involved at different stages in the investment process plays a role in venture performance, we may presume that a BAN’s value added ultimately depends on those members who are active. In other words, for a BAN to be efficacious, it is not necessary that all its members play an active role. The intensity (time spent) and type of involvement (due diligence, board participation, mentoring, etc.) of some network members are likely to have a bearing on the type of outcomes (low failure rates of many small size ventures, some big successes in large scale ventures, member satisfaction, ...) of a network’s overall activity. Testing this assumption is beyond the scope of the present paper and needs further research. At this stage, the best we can do is to look at member satisfaction with their network as a crude proxy of its efficacy. Our goal is more modestly to understand the intensity and type of involvement of BAN members. Who are the active angels and what explains their involvement?

We believe the present paper is the first aiming at reaching a better understanding of the determinants of BAs’ active involvement in making BANs accomplish diverse functions and building cognitive resources and shared competencies. We propose a framework where

angels' human capital and cognitive process (in terms of predictive vs. control-oriented behavior) are key in explaining their degree and type of involvement with diverse BAN activities. To test the related assumptions, we conducted a questionnaire survey with a regional French Business Angel Network.

The remainder of this paper is organized as follows. Section 1 presents a brief literature review on the state of BAN research. Section 2 develops a model of BA involvement in diverse network activities/functions. Based on earlier research on angel cognition (Bonnet *et al.*, 2013, Wiltbank *et al.*, 2009), it is argued that the contribution to certain network activities by individual angels is influenced by the more or less predictive and/or control-oriented character of their decision-making style and by angels' human capital. In order to test the model, we analyze the data gained from a questionnaire survey conducted on a regional French BAN. Section 3 reports descriptive data from the survey, which show how network members perceive the extent to which the BAN actually accomplishes its generic functions. Section 4 reports the results of the tests of individual BA involvement in providing various network services.

1. A review of BAN activities

According to Becker-Blease & Sohl (2011, p. 715), "*Business angel networks or groups [...] are comprised of angels who join with other angels in an organized form. Groups provide a method for angels to pool resources, reduce search and transaction costs, and mitigate adverse selection and agency costs*". However, the functions of BANs have changed through time. While first generation networks were merely providing matching services between angel investors and entrepreneurs, a growing number of BANs now act as groups in which deal selection, due diligence and deal structuring are shared between members and co-investment is quasi-systematic (Gregson *et al.*, 2013; Mason, 2006).

Following a review of the literature, we propose to classify BAN activities into five broad categories: (1) matching and deal selection, (2) deal syndication, (3) due diligence, deal structuring and post-investment services, (4) training and professionalization of angel investors and (5) BAN governance and management.

1.1 Matching and deal selection

In a market characterized by significant information gaps between entrepreneurs needing to raise equity and potential angel investors, matching SMEs with BAs has historically been the

raison d'être of BANs (Mason, 2006). BANs make angel investors visible to entrepreneurs, which is particularly valuable for the less active investors who do not have a name or reputation in the entrepreneurial community (Aernoudt *et al.*, 2007). Matching is done through company presentation events, newsletters or the internet (Aernoudt, 2005; EBAN, 2014). To improve matching effectiveness, most BANs select entrepreneurial projects, and sometimes coach entrepreneurs, in order to ensure that only high quality and investment-ready projects are presented (zu Knyphausen-Aufsess and Westphal, 2008). Would be angel network members are also selected, although the degree of selection varies significantly between highly selective syndicates counting a small number of high net worth members (Mason, 2006) and larger, more open networks based on geography, common industry experience or education.

There is no academic consensus on the effectiveness of BANs as matching devices. It is recognized that BANs have considerably contributed to raise awareness on angel financing, to increase angel investment activity (Aernoudt *et al.*, 2007, Mason and Harrison, 2002) and to alleviate information and financing problems for young entrepreneurial companies (Collewaerdt *et al.*, 2010). However, it seems that some BANs fail to provide enough good quality deals to their members and do not succeed in attracting enough angel investors, as Mason and Harrison (2002) have shown for “first generation” BANs in the UK. Adverse selection issues have also been documented. Zu Knyphausen-Aufsess and Westphal (2008) contend that, when they help young ventures to become investment ready, BANs may blur the signals that enable angel investors to identify the best projects. However, the view that BANs attract low quality deals is not confirmed by the empirical results of Collewaerdt *et al.* (2010).

1.2 Syndication

Since BAs have limited time and financial resources, syndication between them is highly relevant. Syndication allows BAs to access larger deals, to diversify their investments and to learn from angels with more investment experience (Aernoudt, 2005). Although it may be done informally outside organized networks, BANs offer appropriate conditions to co-invest as they allow investors to meet regularly, to create social ties and trust, to gain access to the same investment opportunities and share experience and knowledge of various industries (Christensen, 2011; Mason, 2006). While syndication between angels is generally viewed as having a positive economic impact by contributing to reduce transaction costs and to mobilize funds from less experienced angels (Mason, 2006), we lack empirical data on its extent and impact. According to EBAN (2014), 67% of BANs offer syndication services, but the

proportion of investments that are actually syndicated is unknown. San José et al. (2005) mention that syndication is still underdeveloped in Europe compared to the US. In the UK, Mason (2006) notes a rapid increase of the proportion of syndicated deals in BANs between the mid-90s and 2003. Syndicated deals correspond to various types of situations: packaged investments offered to investors operating independently from each other, ad-hoc deal-specific syndicates formed by BANs, and organized angel syndicates or funds (France Angels, 2015; Mason, 2006).

In addition to offering co-investment opportunities with other angel investors, some BANs are also part of co-investment schemes with government supported VC funds aiming at complementing angel funding with public funds.

1.3 Due diligence, deal structuring and post-investment services

In 2002, Mason and Harrison noted that UK BAs were often dissatisfied with the quality of investment proposals they receive and frequently fail to negotiate acceptable terms and conditions with entrepreneurs. They called for the emergence of a second generation of BANs that would offer due diligence, pricing and deal structuring services in addition to a mere introduction to investment opportunities. The rationale in offering these services is to increase the probability of the completion of a deal (Aernoudt et al., 2007) and to share costs and expertise between angel investors. There is evidence that 50% of European BANs now propose these services (EBAN, 2014). According to Mason (2009), one third of BANs operating in the UK in 2008 were commercially oriented networks offering due diligence and negotiation services. Although data on post investment services is scarce, anecdotal evidence shows that BANs and syndicates frequently delegate members to the board of directors or to the strategic committees of investee companies, in order to monitor management and to provide resources such as strategic advice and mentoring.

While the proportion of BANs offering value added services such as due diligence, deal structuring and post-investment services has increased in recent years, the long term viability of these networks has been challenged. As Zu Knyphausen-Aufsess and Westphal (2008) contend, the presence of experienced serial angels is necessary for a network to provide value-added services and to attract unexperienced virgin angels. However they note that the more experienced angels may not need services that they have the ability and/or the preference to perform themselves.

1.4 Training and professionalization of angel investors

An important limitation to the development of the informal VC market lies in the fact that unexperienced “virgin” angels often do not master the risk-analysis of a young venture and the process of an equity investment. They therefore encounter difficulties in making their first investment even if they have the desire and the financial capacity to become an angel investor (Aernoudt, 2005; Mason and Harrison, 2002). Experienced angels also recognize that they need to improve their investment skills (San Jose et al., 2005).

BANs may play an important role in providing training to BAs. According to EBAN (2014), 87% of European BANs provide training for investors. Mason (2009) indicates that training is mostly offered by second generation BANs (i.e. providing more than matching services) since the 2000's. In addition to organizing training sessions for members, BANs, as well as their national federations, contribute to professionalize angel investing by designing formal tools such as due diligence check lists, company valuation models, codes of venture-governance (France Angels, 2011).

Some BANs also offer training services for entrepreneurs in order to make their firms “investment ready” (Mason, 2009). The objective of these programs is to increase the number of investable deals that BAs receive, as many entrepreneurs lack a good comprehension of investors' expectations and selection criteria (Mason and Harrison, 2002). However, these programs have been criticized as having a potential adverse selection effect by attracting low quality deals (Christensen, 2011) and by deteriorating the signaling quality of business plans and management presentations (zu Knyphausen-Aufsess and Westphal, 2008).

1.5 BAN governance and management

The governance and management of BANs relate to activities that are usually performed by the networks' boards of directors. They include tasks such as monitoring the network, contributing to strategy formulation, and gathering external financial and non-financial resources. The latter includes actions such as building a network of partners at a local or national level (other BA networks, VC firms, banks, professional service firms, public authorities, trade associations) and lobbying on legal and tax issues. These actions aim at enlarging the deal flow and the investment capacity, and at securing financial resources for the network.

2. A model of BA involvement in BAN activities

The literature review on BANs shows that angel networks provide a variety of services. Most of them are ultimately related to different mechanisms of venture governance: creating deal flow potentially enhances the efficiency of the informal venture capital market and thus influences ownership and control, due diligence allows for ex-ante monitoring by reducing information asymmetry, board representation potentially enhances post-investment monitoring and strategic advice, etc. However, BAN activities are often presented in purely empirical terms and a significant proportion of the related literature remains highly descriptive. In order to better understand the active involvement of individual angels in various BAN activities, it is helpful to create theory-based categories. To make some progress in this direction, we suggest to refer to recent analyses of governance that integrate a strong cognitive component, since most BAN activities are more or less directly related to young venture governance and investors at the seed stage face particular cognitive challenges related to conditions of strong uncertainty (Wiltbank et al., 2009). Governance can be broadly defined as all mechanisms which govern the conduct of top managers and entrepreneurs. As such it is a complex multilevel system (Uhlaner, Wright & Huse, 2007; Charreaux, 2008; Wirtz, 2011): diverse mechanisms, some specific to a venture (e.g. the board of directors), others more general (e.g. the market for control), interact dynamically and play various roles. More specifically, the actors involved (BAs in our case) may assume disciplinary, cognitive and/or behavioral roles when they get involved in governance.

Since we want to understand BA involvement, the unit of analysis of the present research is the individual BA. With respect to a BAN, individual angel involvement may actually concern two distinct levels of analysis: (1) involvement in the governance and management of the network itself and (2) direct involvement in the governance of specific target ventures. Involvement at either level may eventually enhance BAN efficacy. The first level has an impact on the more or less smooth functioning of the network and the acquisition of shared competencies, whereas the second level is likely to have a bearing on the network's investment outcomes.

Moreover, the literature on governance roles, be it in general terms or more specifically focused on an entrepreneurial setting, teaches us that involvement in governance activities can take on different forms and make the governance mechanisms play different roles (Zahra & Pearce, 1989; Uhlaner, Wright & Huse, 2007). Hence governance can act as a behavioral, cognitive, or disciplinary lever (Charreaux and Wirtz, 2006; Wirtz, 2011). Standard

explanations of governance heavily rely on agency theory (Daily, Dalton, Cannella, 2003) to help understand the involvement in discipline-enhancing governance activities, as a consequence of economic incentives based on the rationale of maximizing expected utility (Jensen and Meckling, 1976) (predictive logic). Resource- and knowledge based theories (Penrose, 1959; Barney, 1991; Zahra and Filatotchev, 2004) show that, depending on their individual knowledge and skills (human capital) and on their cognitive characteristics, the actors of the governance process shape collective learning and resource acquisition in an open world where future outcomes are co-constructed collectively. Based on the preceding discussion, we propose a typology of BAN activities according to two dimensions: (1) governance level (network/venture) and (2) governance role (financial discipline/cognitive lever).

Figure 1- A Theory-Based Typology of BAN Activities

	Venture governance	BAN governance and management
Financial discipline and information management (theory background: standard financial modelling based on a predictive logic of rational expectations and maximizing expected utility in risky environments: agency theory)	<ul style="list-style-type: none"> - Deal selection and matching - Due diligence - Deal structuring (price and contracts negotiation) - Post investment monitoring (financial reporting, ...) 	<ul style="list-style-type: none"> - Deal flow - Forming and managing angel syndicates - Creating formalized information-based tools (due diligence checklist, code of venture governance ...) - Monitoring of network activities and gathering external resources (board participation)
Skill enhancement and knowledge management (theory background: conceptualize the joint construction of idiosyncratic (cognitive) resources in uncertain environments: resource- and knowledge based theories, effectual logic)	<ul style="list-style-type: none"> - Strategic advice - Post-investment mentoring 	<ul style="list-style-type: none"> - Training seminars for members (BAs) - Participation in the formulation of BAN strategy (board participation)

Financial discipline is achieved through various monitoring mechanisms and incentive schemes which are meant to reduce agency costs and thus enhance value, when a young venture sells outside equity (Jensen and Meckling, 1976; van Osnabrugge, 2000). Accordingly, angel involvement in disciplinary governance at the venture level concerns activities such as due diligence, financial reporting, etc. Angel involvement in cognitive venture governance may take on the form of strategic advice given to the entrepreneur and post-investment mentoring. At the BAN level, the network's board members may play different roles according to circumstances: angels who serve as directors play a cognitive role when they are involved in the formulation of BAN strategy. They exert financial discipline, when they monitor network activities. Consequently, active involvement in BAN boards can serve both, disciplinary and cognitive purposes. Contributing to deal-flow is, in the first instance, an information related matter. It helps the BAN in reducing information asymmetry for its members. The organization of training seminars at the BAN level potentially enhances the network's collective skills and knowledge, it is consequently a cognitive activity.

Now that we have characterized different activities related to BAN governance and management, how can the involvement of individual BAs in different BAN activities be explained?

For a participant in the governance process (an individual BA) to be able and willing to assume certain disciplinary and/or cognitive roles, his specific human capital (knowledge and skills derived from education and experience) (Kor and Sundaramurthy, 2009) and cognitive process (decision making style) (Wiltbank et al., 2009) can be expected to be of great importance. Hence, to get involved in exerting financial discipline presupposes the existence of financial incentives and a decision making style which is in line with the economic rationale of expected utility maximization (predictive). Being able to contribute relevant cognitive resources may depend on specific human capital, and also on certain cognitive predispositions. In fact, especially in the context of young ventures, cognitive process features which allow an individual to decide under conditions of strong uncertainty (Sarasvathy, 2001) may explain certain forms of involvement.

Wiltbank et al. (2009) show that BAs' decision-making style influences their investment behavior and the way they get involved with the ventures they invest in. Based on Sarasvathy's work on effectuation, they propose two measures of decision-making styles: prediction and control orientation. A predictive approach to decision making means that an individual's cognitive process and decision making strongly rely on formal tools helping to

predict future outcomes. Typically, that is the way investment decision making is taught in standard courses of finance, where the rational decision-maker is supposed to choose investments that maximize net present value. Decision making thus heavily relies on ex-ante prediction according to the rationale of maximizing expected utility. Highly predictive individuals need access to all relevant existing information helping them to make unambiguous predictions from objective data.

H1: At the level of venture governance, predictive BAs get more involved in disciplinary activities and information management than non-predictive BAs (deal selection, due diligence, deal structuring ...).

H2: At the level of BAN management, predictive BAs get more involved in the establishment and promotion of standard tools for venture governance (due diligence checklist, governance code of best practice ...) than BAs with a weak prediction orientation.

Control-orientation is a different approach to decision making, although it is not necessarily opposed to prediction. Certain individuals can score high on prediction and on control-orientation. Others, however, are non-predictive and control oriented. The latter adapt to circumstances as events unfold. They are not trapped in static ex-ante reasoning, but make decisions based on their perception of the possibilities of active intervention whenever necessary, making the best of the existing resources in given circumstances. What is more important to control-oriented individuals than reliable predictions about future outcomes is the perception that they have the capacity to actively influence the course of events, even though the latter may not be anticipated, as is the case in highly uncertain environments³. It can hence be supposed that control-orientation favors continuous direct intervention in various activities.

H3: Strongly control oriented BAs spend more time in BAN activities than individuals with weak control orientation.

Control orientation implies the possibility of continuous interaction, hence

H4: At the level of venture governance, strongly control oriented BAs get involved in post-investment activities.

³ Concerning the distinction between risk and uncertainty, the interested reader may refer to Knight (1921). Rational expectations and the ability to maximize expected utility suppose the existence of a risky environment. In fact, risk means that possible future states of the world are known and can be assigned a probability distribution. Under conditions of strong uncertainty future states of the world are not predictable. Standard financial tools are based on the notion of risk but not Knightian uncertainty.

H5: At the level of BAN governance, strongly control oriented BAs get continuously involved with the board of the network.

Where predictive decision making strongly relies on the prospects of future returns established on the basis of existing information, control-oriented individuals (effectuators) rely on their personal resources and adapt to unpredicted circumstances as events unfold. This may in turn favor a focus on the development of specific cognitive resources.

H6: Control-oriented BAs get more involved in skill enhancement and knowledge acquisition than those who score low on control-orientation.

The will and motivation to get involved in BAN activities is one thing, the ability to do so another. Individuals differ with respect to human capital and the latter influences the capability to perform various activities. The acquisition of human capital (knowledge, skills, competencies) depends on education and training, as well as on-the-job experience (Becker, 1964). It is reasonable to assume that BANs tend to use rationally the competencies of their members. Therefore we can expect that network members whose education or experience grants them specific capabilities to perform given activities will tend to get more involved in such activities. Past research on formal VC suggests that finance experience helps investors with analyzing the financial projections proposed by the venture seeking funds and with having a good understanding of the valuation and deal structuring process (Dimov and Shepherd 2005; Walske and Zacharakis 2009). It is reasonable to suppose that BA involvement in the exercise of financial discipline and the limitation of potential agency conflicts is enhanced by the acquisition of a strong culture in standard finance. Therefore:

H7: Having acquired financial experience or training is positively related to the exercise of disciplinary governance activities (due diligence, deal structuring, ...).

Certain cognitive BAN activities, such as the formulation of BAN strategy, mentoring and the provision of strategic advice to entrepreneurs etc. most likely require specific managerial skills. A strong previous experience in the formulation and conduct of strategy, as an entrepreneur, top manager or CEO may be considered to be especially helpful in this respect.

H8: A strong strategic experience positively influences BA involvement in cognitive activities (formulation of BAN strategy, providing mentoring and strategic advice to entrepreneurs, ...).

3. BAN functions, BA involvement and cognition: descriptive statistics from the survey

In this section we present our data collection method, sample features, and descriptive statistics.

3.1 Data collection and overall sample features

a. Data collection

A questionnaire containing a total of 35 questions was posted on Monday, February 9, 2015 on the internet. The link to the questionnaire platform was sent to members of Business Angel Network Savoie-Montblanc Angels (SAMBA). This BAN is located in the Rhône-Alpes region. The region is known for its dynamism and intense entrepreneurial activity and hosts some of the larger and more dynamic angel networks in France.

The survey instrument covers four types of data: the individual characteristics of business angels (age, gender, ...), their overall and specific satisfaction with network services, their involvement in specific BAN activities, and their decision making style and human capital features (dimensions of prediction and control, as well as experience in strategy, marketing, finance, as a CEO, as an entrepreneur). Appendix 1 contains a summary of the principal variables measured through the questionnaire. The initial survey instrument was developed and discussed with the director of the Savoie-Montblanc network and ourselves and pretested by four network members.

The survey was conducted online with Qualtrics survey software. Initially an e-mail invitation to participate in the study was sent by network managers to the members. A reminder was sent approximately six weeks later.

At the closure of the online survey, the total number of respondents was 85. Thirty-nine responses were incomplete, taking the exploitable sample to 46 Business Angels. The total population of SAMBA network members is estimated to be 197 which results in a response rate of approximately 23%. This is consistent with prior studies investigating business angels networks in the US and the UK.

b. Sample features

Our respondents' characteristics are close to those reported in earlier studies in France (Bonnet and Wirtz, 2013). They are mostly men (93.5%) and they are 59 of age on average. 82% of them hold a degree of higher education (master level for 52 % of them and doctorate level for 30 %). 63 % of them are professionally active (entrepreneurs account for 24 %) and 37% of BAs are retired. They are at 76% subject to wealth tax.

c. Investment

80% of the 46 respondents have at least made one investment, and 76% of respondents have made their investment inside the BAN. Since their first investment, BAs have on average primarily invested via a network in 3 ventures. Beyond directly investing in individual ventures they have also invested once or twice (average of 1.67) in funds organized by the network (SIBA, Business Angels Investment Fund).

The cumulative investment per active angel in our sample (total since he/she started to invest) is below €25,000 for 8% of respondents; 41% indicate investing between €25,000 and 50,000; 32% indicate investing between €50,000 and 100,000, and only 8% above €500,000. For investments made via BAs networks: None of the BAs surveyed think they will multiply by more than 2 the value of the capital invested. 42.86 % believe this multiple to be between 1 and 2. 37.14 % recover roughly the amount invested and 20 % think they will get back less than the amount invested. For investments made by BAN members outside their networks: 13.64 % of Business Angels surveyed think they will multiply by more than 2 their initial investment and 13.64 % believe this multiple to be between 1 and 2. 45.45 % recover roughly the amount invested and 27.27 % think they will get back less than the amount invested.

3.2 Overall satisfaction with network services

38 out of 46 respondents are satisfied or totally satisfied with their network; Angels who are actively involved and those who are passive are equally satisfied (mean score of satisfaction =4.09 on a five-point scale). Member satisfaction may be considered as a crude proxy for value-added. Indeed, it is reasonable to suppose that a high score of satisfaction implies that respondents perceive added value in a BAN.

Beyond overall satisfaction, we can observe 35 out of 46 respondents who find that the network has made progress in terms of professionalization over the last 10 years and for 21 of them, this is one of the reasons that actually led them to join a network.

3.3 Satisfaction with respect to specific network services

Satisfaction depends on the delivery of certain network services. It was measured on a five-point scale for various items. BAs assess the benefits (or services) of their network by the number of investment opportunities (3.96) and quality of the investments (3.78). For BAs, the network gives them the tools needed for a more rational approach to investment (4.13) and contributes to the fact that the activity of BAs has a greater recognition by public authorities (4.2), by entrepreneurs (4.09) and other finance professionals (4.02). BAs consider their

investor role as a provider of knowledge and skills. They benefit from other members' experience and skills (4.04). BAs consider that their network contributes to local economic development (4.39). Table 1 summarizes the responses with an average score above 3.5.

Table 1- Satisfaction with BAN services (on a five point scale)

Statistic	Mean	Standard deviation
The BAN allows me to have access to a greater number of investment opportunities	3.96	1.25
The investment opportunities offered are of good quality	3.78	0.99
The details given by the network on the evolution of changes in tax regulation are helpful to me	3.87	1.38
Being a member of the network allows me to develop my personal contacts	3.91	0.86
The network contributes to local economic development	4.39	0.65
I can bring my experience and expertise to the network	3.70	0.94
get benefit from the experience and expertise of other network members	4.04	0.63
The network plays an active role in the recognition of Business Angels by financial professionals (banks, venture capitalists...)	4.02	1.2
The network plays an active role in the recognition and the legitimacy of Business Angels to the public and public authorities	4.2	1.09
The network plays an active role in the recognition of Business Angels by entrepreneurs	4.09	1.09
The network provides tools and services that enable a rational approach to investment (due diligence, assessment methods, shareholder agreements, good governance charter.)	4.13	1.11

3.4 BA involvement

Network services that underpin member satisfaction are to a large extent provided by certain members themselves. Services and the resulting satisfaction are hence likely to depend on active BA involvement. Not all BAs are however equally involved. Involvement in network activities in terms of overall intensity (number of days/time spent in network activities) and type of involvement are generally heterogeneous. 54.3% of responding angels can be considered as strongly involved, investing at least 6 days per year in BAN activities. There is also heterogeneity concerning different types of involvement. 97.83 % of BAs attend company presentation events at least once a year. A much smaller proportion of BAs bring investment opportunities (30.43 % contribute to deal flow), participate in the pre- selection of investments (41.30 %) and get actively involved in due diligence (47.83 %). 41.3% participate in post-investment monitoring. Table 2 summarizes the percentage of yes/no respondents for the various activities.

Table 2 – Involvement in BAN activities

	Answers	% Yes	% No
1	Deal flow: You bring investment opportunities.	30,43%	69,57%
2	You attend at least once a year company presentation events	97,83%	2,17%
3	You attend at least once a year training sessions	60,87%	39,13%
4	Formal pre selection : You contribute to the pre selection of investments	41,30%	58,70%
5	Due diligence: You contribute to due diligence concerning investments	47,83%	52,17%
6	You lead training sessions for members	8,70%	91,30%
7	Post investment : You take part in the post-investment supervision of ventures	41,30%	58,70%
8	You are a member of the board of your network	26,09%	73,91%
9	You are a director or member of the investment committee of a fund organized by your network	19,57%	80,43%

Table 3 (below) establishes a correspondence of the items measured in table 2 with our theory-driven typology of BAN-activities described in Figure 1. The corresponding items in table 2 are indicated in parentheses; i.e. due diligence activity is measured by item 5 of table 2.

Table 3- BAN-activity-typology

	Venture governance	BAN governance and management
Financial discipline and information management	<ul style="list-style-type: none"> - Due diligence (5) - Formal pre-selection of potential deals (4) - Post investment monitoring (7) 	<ul style="list-style-type: none"> - Deal flow (1) - Monitoring of network activities <ul style="list-style-type: none"> ➤ BAN board participation (8) ➤ BAN general meeting (2) ➤ BAN-fund investment committee and board (9)
Skill enhancement and knowledge management	<ul style="list-style-type: none"> - Post-investment mentoring (7) 	<ul style="list-style-type: none"> - Training seminars for members (BAs) (3,6) - Participation in the formulation of BAN strategy (board participation) (8)

3.5 Decision making style and human capital

• Decision making style

The items used to measure prediction (4 items) and control (2 items) were developed based on the literature (e.g. Wiltbank, Read, Dew and Sarasvathy, 2009; Bonnet, Wirtz and Haon, 2013) and selected to fully capture each concept. According to Bonnet et al. 2013, they are formative. We used a five-point Likert scale and respondents rated their agreement or disagreement with each item.

The following items are formative measures of prediction. Mean scores for our sample feature in parentheses.:

- When you evaluate a venture's strategy, you study the strategy of competitors (mean 3.76) ;
- When you gather information on the project, you study expert forecasts. (mean 3.61) ;
- When you look at the forecasts for the project, you use them to establish the net present value of the company (discounted cash flows). (mean 3.33) ;
- You base your decision to invest on the internal rate of return (IRR) of the project (mean 3.2).

Control orientation was measured by the following items:

- When assessing the venture's strategy, you think about the way you can contribute to it. (mean 3.61) ;
- You base your decision to invest in the project on the value added that you are able to deliver through your accompaniment of the company (mean 2.78)

The descriptive statistics for these variables featuring the percentage of high prediction and high control individuals (measures of at least 4 on the Likert scale) are presented in table 4.

Table 4 - Descriptive statistics for high prediction and control

Prediction oriented	Agree	strongly agree	Percent	Total Responses	Mean	Median
When you gather information on the project, you study expert forecasts.	23	10	71,70%	46	3.61	4
When you look at the forecasts for the project, you use them to establish the net present value of the company (discounted cash flows).	23	5	60,90%	46	3.33	4
When you evaluate the venture's strategy, you study the strategy of competitors	25	10	76,00%	46	3.76	4
You base your decision to invest on the internal rate of return (IRR) of the project	17	3	43,50%	46	3.20	3
Control oriented	Agree	strongly agree	Percent	Total Responses	Mean	Median
When assessing the venture's strategy, you think about the way you can contribute to it.	20	11	67,40%	46	3.61	4
You base your decision to invest in the project on the value added that you are able to deliver through your accompaniment of the company	10	5	32,60%	46	2.78	3

Descriptive statistics show that there is heterogeneity among angels concerning decision making style. Although a strong proportion of BAs within the BAN have a highly predictive approach in their investment decisions, that is not the case for all of them. Depending on items, the proportion of respondents scoring high (minimum of 4 on a five-point scale) on prediction varies between 43.5% and 71.7%. Proportions of highly control-oriented

individuals are 67.4% or 32.6%, depending on which item is considered. So we can conclude that not all angels of our sample share the same cognitive process when it comes to investment decision making. Highly predictive angels share a quasi-rational decision-making style, where investment decisions follow a logic of maximizing expected utility, whereas angels that are non-predictive and strongly control-oriented act as effectuators. Heterogeneity in our sample in terms of angels' cognitive process is an interesting result in itself, which may have important consequences for BAN members' behavior. Earlier research has shown that decision making style has an impact on investment-target profile and investment outcomes (Wiltbank et al., 2009) and on BA co-investment with professional VC-funds, the most predictive BAs being the ones that are most likely to invest alongside professional VCs (Bonnet, Wirtz, Haon, 2013), since they are able to communicate in the same conceptual language of standard financial economics. In the following section, we will test if heterogeneity in decision making style of individual BAs also has an impact on the inner workings of BANs.

- Human capital

« Professional experience », a basis for the acquisition of human capital, was measured by asking Business Angels to report the number of years spent in each function. We then considered that to have acquired a significant experience in a certain function, on-the-the-job experience of at least one year is required. We hence created a series of binary variables coded 1 if there was a certain experience (for example as an entrepreneur or a CEO) and 0 for no such experience. The variable “entrepreneur” is coded (1= worked as an entrepreneur over one year / 0= worked less than one year as an entrepreneur), based on BAs' answers. Table 5 indicates summary statistics of respondents with certain human capital features: strategy, marketing, finance CEO, entrepreneur. As reported in earlier research (Bonnet, Wirtz & Haon, 2013), many BAs have an entrepreneurial background. Indeed, 21 of our respondents (45.65%) declare having an entrepreneurial experience (N=46) and 78% have an experience as a CEO.

Table 5 - Type of functional experience (=human capital feature, coded 1 if at least 1 year of work experience)

	Frequency	Percent
CEO	36	78,26%
Strategy	10	21,74%
Marketing	16	34,78%
Finance	19	41,30%
Entrepreneur	21	45,65%
n =	46	

We observe heterogeneity in the professional experience of BAN members. Slightly less than half of our sample angels feature an entrepreneurial experience (approximately 46%). Almost 80% have significant experience as a CEO. In terms of functional experience, marketing and sales (approx.. 35%) and finance (approx.. 41%) represent a significant proportion of BAN members. In the following section, we will test the impact of various human capital features on BA involvement in their network and in specific network activities. Are there specific human capital features that favor strong involvement more than others?

4. Testing the model

We ran logistic regressions to test the impact of decision-making style and human-capital features on individual BA involvement in BAN activities. Involvement was measured by (1) its intensity (total time spent in all BAN activities) and (2) actual involvement in each specific type of BAN activity (binary variables) (cf. figure 1).

Table 6 – Test results for intensity of BA involvement in network activities (strong involvement when number of days per year > 12)

	Estimate	Std. Error	Wald	df	P.-value
Predictive BA	0,223	0,734	0,092	1	0,761
Control oriented BA	2,015	1,111	3,292	1	0,07
Strategy experience	3,245	0,916	12,54	1	0
Marketing experience	1,361	0,745	3,337	1	0,068
Finance experience	0,452	0,719	0,395	1	0,53

Three variables turn out to be significant in an explanation of strong involvement. We observe that strong control orientation favors strong overall involvement in network activities at the

7% level (p-value 0.07). This is consistent with hypothesis 3. Professional experience in strategy and marketing-related functions also significantly enhances strong involvement in BAN activities.

If we look at logistic regression results for involvement in specific BAN activities, control orientation turns out to be a significant explanation at the 10% level for BAs joining the board of the network (Wald = 2.74; p-value = 0.098). This is consistent with hypothesis 5.

In terms of human capital features, a work experience in marketing and sales appears to be the single most important predictor for involvement in the following BAN activities: pre-selection (Wald = 7.023; p-value = 0.008), due diligence (Wald = 4.102; p-value = 0.043), and post-investment follow-up (Wald = 4.336; p-value = 0.037). This may be explained by the relevance of a marketing and sales experience for the evaluation of the potential and success of young ventures' products and services on the market, which is hardly surprising.

Besides marketing and sales, the only other human capital feature that turns out to be significant for a specific BAN activity, namely the participation on the board of a BAN investment-fund, is experience in the finance profession (Wald = 5.152, p-value = 0.023), which is not surprising and partially confirms hypothesis 7.

No other variable turns out to be significant.

Conclusion

In our sample, the involvement of BAN-members in their network's activities at various levels is explained by a strongly control-oriented decision-making style as well as by human capital features related to experience in strategy, marketing and sales. Control orientation hence appears to be a significant driver of a BAN's operations and efficacy. Surprisingly, a strongly predictive decision making style does not appear to have a significant influence on specific information-oriented BAN activities (such as due diligence, etc.). The corresponding hypotheses could not be corroborated. One possible explanation for the absence of a significant relationship between a predictive decision-making style and disciplinary and information-related governance activities may reside in the increasing professionalization of BAN services over the past decade that is perceived by respondents, as indicated in our descriptive results. Professionalization most likely led to adopt certain information-related governance practices and tools (due diligence, etc.) as the network's standard best practice,

independently of Angels' individual cognitive features. That may have been different at the network's origin, where it is reasonable to assume that individual member-characteristics had a strong bearing, due to a lack of yet to be established organizational routines. Testing this assumption is of course beyond the scope of the present research and needs further investigation. Qualitative longitudinal case studies of the development process of one or more BANs may bring new insights.

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Appendix 1 - Inventory of dependent and explanatory variables

Category	Variable
Decision making style (explanatory)	Prediction (multi-item formative 5-point Likert scale; individuals are considered highly predictive if they score above median) Control orientation (multi-item formative 5-point Likert scale; individuals are considered control oriented if they score above median)
Human Capital features (explanatory)	Type of functional experience (coded 1 if at least one year of experience, 0 otherwise) CEO strategy, marketing, finance, entrepreneur
BA involvement (dependent)	Type of involvement (1 if involved 0 if no involvement) <ul style="list-style-type: none"> - Deal flow - BAN general meeting - Training seminars for members (BAs) - Formal pre-selection of potential deals - Due diligence - Post investment monitoring - BAN board participation - BAN-fund investment committee and board Intensity of involvement <ul style="list-style-type: none"> - Number of days per year spent in the activities of the BAN Less than 12 days per year = low intensity (0) At least 12 days per year = high intensity (1)